CHAPTER VI

CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

Modifyied bacterial cellulose membrane with alginate supplement (BC-alginate) during its biosynthesis was higher degree of swelling than BC membrane. It indicated that this membrane was highly hydrophilic than BC membrane. From SEM micrograph of surfaces and BET result, we found that the average pore size decreased when increasing alginate content.

FTIR spectroscopy was used to evaluate the interaction between BC fiber and alginate molecules. The result indicated that interactions might present between the hydroxyl groups of BC fiber and the carboxylic groups of alginate.

For BC film, the average pore diameter, the tensile strength, Young's modulus, the elongation at break, the degree of swelling, the WVTR and the OTR were 224 A^{o}, 5.30 MPa, 172 MPa, 3.76%, 524%, 2,106 g/m^2day and 36,544 cc/m^2day respectively.

For BCA membrane with the supplement of 1% alginate, the average pore diameter, the tensile strength, Young's modulus, the elongation at break, the degree of swelling , the WVTR and the OTR were 39 A^{o}, 3.80 MPa, 144 MPa, 2.61%, 706%, 1,815 g/m^2day and 57 cc/m^2day respectively.

To study the effect of operating condition on flux and selectivity, pervaporation experiment was performed by using the developed BCA membranes. It was found that the BCA membrane at 1%alginate supplement gave the highest selectivity when compared those with 0-0.75% supplements of alginate content.

Furthermore, increasing the thickness of membrane was strongly increased the membrane selectivity. It was found that decreasing permeate pressure, increased both the selectivity and flux and lowering temperature gave the higher selectivity.

6.2 Recommendations for future studies.

Based on this study, further studies for the improvement of bacterial cellulose film for pervaporation are recommended.

1. The study of modifying bacterial cellulose by synthesizing with other natural polymer.

2. The study of pervaporation ethanol-water by decreasing the permeate pressure while increasing thickness of membrane.